On the Osmylinae of Japan.

By

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In order to supplement in a way the works of MacLachlan,[1] and Navás[2] on the Osmylinæ of this part of the world, it is proposed to give in this paper an account of all the forms of that subfamily known to me from Japan (not including Formosa). Though the material which came under my examination cannot be said to be extensive, I have thus far been able to recognize fourteen species as occurring in the region referred to. Of that number, seven seem to be new to science and one to be new to Japan, while the remaining six represent all those species which have hitherto been recorded from that country. Here I let follow the list:

FAMILY HEMEROBIIDAE.

Subfamily Osmylinæ.

Tribe Sisyrini.

1. *Sisyra japonica* n. sp.
2. *S. ozenumana* n. sp.
3. *Sisyra Yamamurae* n. sp.

Tribe Berothini.

4. *Berotha* (*Isoscelipteron*) *Okamotonis* n. sp.

Tribe Osmylini.

5. *Spilosmylus tuberculatus* (Walker).
6. *S. nikkoënsis* (Navás).
7. *Spilosmylus flavicornis* (MacLachlan).
8. *S. immaculatus* n. sp.

1) A Sketch of our present knowledge of the neuropterous fauna of Japan (excluding Odonata and Trichoptera). Trans. Ent. Soc. Lond., Pt. ii (1875).

2) Osmylides exotiques neuveaux. Ann. Soc. Scient. Bruxelles (1910).

—— Névroptères neuveaux de l'extrême Orient. Rev. Russ. d'Entom., xi (1911).

9. *Spilosmylus Harmandinus* (Navás).
10. *S. nigricornis* n. sp.
11. *Osmylus tessellatus* Mac-Lachlan.
12. *Osmylus Pryeri* Mac-Lachlan.
13. *O. decoratus* n. sp.
14. *O. hyalinatus* Mac-Lachlan.

It is an interesting fact that the Indian species, *Spilosmylus tuberculatus*, lately found in Formosa by Petersen,[1] occurs also in Japan. *Osmylus hyalinatus*, common in Hokkaido and occurring also in Hondo and Shikoku, has recently been recorded from Siberia by Navás,[2] so that this species may be said to have a rather wide range of distribution in the northern part of eastern Asia. The following table shows the geographical distribution, as far as can be ascertained, of all the species listed above.

	Siberia.	Saghalien.	Japan.				Formosa.	Philippine.	Assam.	Burma.	Java.
			Hokkaido.	Hondo.	Shikoku.	Kiushiu.					
Sisyra japonica.				*							
S. ozenumana.				*							
S. Yamamurae.				*							
Berotha (Isoscelipteron) Okamotonis.				*							
Spilosmylus tuberculatus.				*			*	*	*	*	*
S. nikkoënsis.			*?	*		*	*?				
S. flavicornis.			*	*	*	*					
S. immaculatus.				*							
S. Harmandinus.		*?	*	*?		*?					
S. nigricornis.				*							
Osmylus tessellatus.				*		*					
O. Pryeri.				*							
O. decoratus.				*		*					
O. hyalinatus.	*		*	*	*						

1) "*Sauter's* Formosa Ausbeute. Neuroptera Planipennia II, Megaloptera and Mecoptera. Ent. Mitt., ii (1913).

2) Quelques Névroptères de la Sibérie méridionale-orientale. Rev. Russ. d'Entom., xii (1912).

FAMILY HEMEROBIIDAE.

Subfamily Osmylinæ.

Certain authors have separated from the Hemerobiidæ such genera as *Osmylus*, *Dilar*, etc., as representing distinct families, but I agree with Banks[1] in thinking that it would be more natural to keep up this family in the broad sense, dividing it into four subfamilies as follows: 1) The Dilarinæ, characterized by the peculiar ovipositor of the female and the pectinate antennæ of the male. 2) The Psychopsinæ, characterized by the union of subcosta, radius and radial sector. 3) The Osmylinæ, in which the subcosta and radius are united near tip of wing. 4) The Hemerobiinæ, to include all the rest of the family.

Of these subfamilies, the Dilarinæ seems to be well differentiated from all the others on account of the male antennæ being of a structure somewhat resembling that in the Sialidæ, and of the ovipositor resembling that of the Rhaphididæ. The remaining three subfamilies are very nearly allied with one another; especially close seems to be the relation between the Osmylinæ and the Hemerobiinæ, and it may even become necessary in the future to unite these two subfamilies into one. Here I should mention that the fact of the union of the subcosta and radius, taken alone by itself, does not seem to be always sufficiently adequate to serve as distinctive criterion between the Osmylinæ and the Hemerobiinæ; for, in a new Japanese Osmyline form (*Sisyra japonica* n. sp.) I have found the union of the said veins only imperfectly carried out. Further, it may be pointed out that *Sisyrella nikkoana* (Navás), a form generally placed under the Hemerobiinæ,[2] so closely approaches *Sisyra* in several respects that it may

1) Synopses and Descriptions of Exotic Neuroptera. Trans. Amer. Ent. Soc., xxxix (1913).

2) Navás, Hémérobides neuveaux du Japon. Rev. Russ. d'Ent., No. 4, p. 397-98 (1910), —Banks, l.c., p. 218.

be said to stand almost on the verge of being an intermediate form between the two subfamilies. In this regard, both *Sisyra japonica* and *Sisyrella nikkoana* are of much interest, and more knowledge about them than we have at present is exceedingly desirable.

Krüger, in his recent work on Osmylidæ[1], has presented a new classification of the family, dividing this into two divisions and six subfamilies, mainly on the basis of venational characters. From the point of view that in this group of insects the details of wing-venation, such as are utilized by Krüger, are something much subject to individual variation and therefore can not be solely depended upon for the systematic purpose, it seems to me that Banks' system before mentioned is the more natural and the more acceptable in the present state of our knowledge.

Tribe **Sisyrini** Banks.

Trans. Amer. Ent. Soc., xxxix, p. 211 (1913).

This tribe includes two genera which can be distinguished as follows:—

{Radial sector with three branches before stigma ....*Sisyra*.
{Radial sector with one branch before stigma.....*Climacia*.

Genus *Climacia* is, so far as known, not represented in Japan.

Genus *Sisyra* Burm.

Sisyra Burmeister, Handb. Entom., ii, p. 975 (1839); Walker (*Hemerobius*, part) Cat. Neuropt. Brit. Mus., ii, p. 296 (1853); Needham, N.Y.S. Mus., Bull. 86, p. 16 (1905); Banks, Proc. Ent. Soc. Wash., xi, p. 76 (1909); Banks, Trans. Amer. Ent. Soc., xxxix, p. 211 (1913).

It may be said that there exist sufficient differences between this

1) Beitrag zu einer Monographie der Neuropteren-Familie der Osmyliden. Stett. Ent. Zeit., 73 Jg. und 74 Jg. (1912-13).

genus and *Climacia* to base generic distinction upon. In *Sisyra* the number of branches from radial sector is constantly well fixed; moreover, it never shows an outer gradate vein, while *Climacia* always has this in some number. Hitherto no *Sisyra* has been recorded from Japan, but I have discovered in Hondo three species, all which seem to be new to science. They may be distinguished as follows:—

1. Anterior margin of hind stigmatic region markedly produced; two of the costal cross-veins separated from the others in forewing; subcosta and radius rather imperfectly united.... ..... *S. japonica.*

—— Anterior margin of hind stigmatic region not produced; none or only one of the costal cross-veins separated in forewing; subcosta and radius perfectly united .....2.

2. Subcosta of forewing darkish; median and cubital veins not connected; head black.....*S. ozenumana.*

—— Subcosta pale; median and cubital veins connected by a cross-vein; head brown .....*S. Yamamuræ.*

Sisyra japonica n. sp. Fig. 1.

Head fuscous black, much swollen above; upper part of face black, lower half including mouth-parts pale yellow; palpi pale, the last joint of maxillary palpi very long and spindle-shaped, that of labial palpi nearly triangular in shape with numerous fine hairs on top and sides; antennæ black at base, terminal half ochraceous yellow.

Prothorax pale yellow, fuscous yellow above, the anterior margin a little produced and spotted with fuscous. Meso- and metathorax also fuscous yellow, each segment suffused with brown at margin, scutella yellowish.

Legs uniformly pale, densely haired, only the last tarsal joint and claw brownish or testaceous.

Abdomen uniformly pale yellow, with a bushy bundle of pale

hairs on each segment; on the ventral side, the hair bundles consist of more numerous hairs; the last three segments much slender than the others; paired lateral appendage of male not long, pointed, fuscous at tip; a large ventral appendage directed upwards, its tip covered with fine hairs; suranal plate much more hairy.

Wings nearly uniform light brown, somewhat darker at costal and apical areas; veins entirely pale.

Forewing with costal cross-veins less than ten in number; none of them separated from others, nor connected with one another by cross-vein; three cross-veins between radius and its sector; a cross-vein between the sector and the hindmost branch of it; veins in stigmatic region undeveloped; subcosta terminally quite imperfect; median forks not connected with cubital.

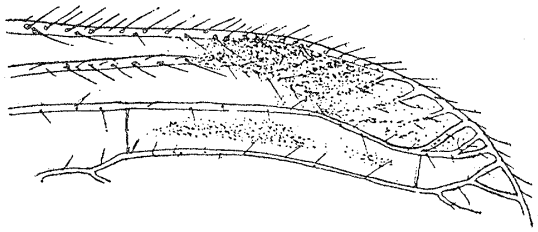

Fig. 1.
Sisyra japonica n. sp.
Pterostigmatic region of fore-wing. 40 ×.

Hind-wing rather wide in the pterostigmatic region, produced and rounded; with six costal cross-veins at base, the innermost cross-vein a little separated from the rest; median and cubital forks connected by a cross-vein.

Measurements:

Length of body	3.5	mm.
,, ,, antennæ	3	,,
,, ,, forewing	4.5	,,
Width of ,,	2.5	,,
Length of hindwing	4	,,

A single male specimen in my collection. It was captured by my friend, Mr. T. Esaki, in his garden in Osaka, middle of August 1913.

Sisyra ozenumana n. sp.

Head black, swollen above; face fuscous black; mouth-parts ochraceous; antennæ deep black, more or less fuscous beyond the middle, a few terminal joints blackish.

Prothorax fuscous, covered with fine hairs; meso- and metathorax ochraceous fuscous, especially so on the back, somewhat paler below; mesothorax much swollen above.

Legs pale yellow; foreleg slightly spotted with darkish; terminal joint of tarsi darker in all the legs.

Abdomen brown; terminal segments lost.

Wings hyaline and uniformly light brown; veins mostly pale, subcosta suffused with light fuscous, other principal veins somewhat dark towards base.

Forewing with 8 costal cross-veins, of which the last one is widely separated from the others: radial sector with 3 branches and connected with radius at three points; a very faint cross-vein between the 1st branch and base of the 2nd branch of the sector; media dichotomously forked three times, the anterior fork with one branch more than the posterior fork; length of cubito-anal cell equals nearly three times the width.

Hindwing with about seven costal cross-veins, all in the basal parts.

Measurements:

Length of body	?	
„ „ antennæ	3	mm.
„ „ forewing	5	„
Width of „	2.4	„
Length of hindwing	4	„

A single specimen (sex undeterminable) obtained by the author on the shore of Lake Oze, Prov. Kōzuke, Aug. 1, 1913.

Sisyra Yamamurae n. sp.

Head ochraceous yellow, covered with yellowish hairs; face yellowish; last joint of maxillary palpi thick and extremely long; antennæ with about 50 joints, black, some terminal joints pale yellow; vertex spotted with fuscous.

Prothorax ochraceous yellow with fuscous spots and yellowish hairs; much wider than long.

Legs pale, with tibia darkened at extremity.

Abdomen much thickened at apex, darkish yellow; on both dorsal and ventral sides, most segments show on the hind margin a black spot covered with long hairs. Paired lateral appendage of male rather large, sending out a pair of long and very slender, upwardly directed, claw-like processes; the slender processes just mentioned not longer than the basal part from which they arise, not crossing each other at their ends.

Wings hyaline, nearly colorless, with yellowish neuration; costal cross-veins rather unequally distributed, nine of them in the basal half and only one in the distal half of the space between base and stigma; media is dichotomously forked three times in forewing, and twice in hindwing.

Hindwing nearly perfectly colorless, excepting anterior marginal area and pterostigma which are yellowish.

Measurements:

Length of body	4.5 mm.
„ „ antennæ	4 „
„ „ forewing	6 „
Width of „	3 „
Length of hindwing	4 „

A single male specimen captured by my friend, Mr. S. Yamamura, in the garden of the Prefectural Agricultural Experiment Station of Shiga (Prov. Ohmi) on May 27th, 1912.

Remark: This species closely resembles *S. Indica*, which Needham[1] described from India, but differs from it distinctly in the structure of the male genital appendage.

Tribe **Berothini** Banks.

Trans. Amer. Ent. Soc., xxxix, p. 211 (1913).

Under this tribe Banks has placed three genera, viz., *Lomamyia*, *Isoscelipteron* and *Berotha*.

Genus *Berotha* Walker.

Berotha Walker, Trans. Ent. Soc. Lond., v. N.S., pt. v, p. 186 (1860); Needham, N.Y.S. Mus., Bull. 86, p. 16 (1905); Banks, Trans. Amer. Ent. Soc., xxxix, p. 212 (1913).

This genus differs from *Lomamyia* in the radial sector being not connected with media.

Banks separated *Isoscelipteron* from *Berotha* on account of the former having eight, instead of four or five, branches to radial sector; however, since some species, as f.i. *Berotha rufa* and *B. nicobarica* described by Navás,[2] show seven branches, and since moreover the number of the branches is subject to variation among individuals of one and the same species, I will not give *Isoscelipteron* more than subgeneric status unless stronger grounds for its generic separation be forthcoming.

Subgenus *Isoscelipteron* Costa.

Isoscelipteron Costa, Fauna del Regno di Napoli[3] (1860-70); Banks, Trans. Amer. Ent. Soc., xxxix, p. 212 (1913).

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1) Notes on the Neuroptera in the collection of the Indian Museum. Rec. Ind. Mus., iii, pt. iii, No. 12, p. 206-07, pl. xxi, fig. i (1909).

2) Crisópidos y Hemeróbidos (Ins. Neur.) nuevos ó críticos. Brotéria, x, Serie Zoologica, fasc. ii, p. 108-09 (1912).

3) This work was unfortunately not accessible to me.

Berotha (*Isoscelipteron*) *Okamotonis* n. sp.

Head yellow, face and mouth-parts somewhat darker; antennæ yellow, basal joint much elongated and covered with yellowish hairs, other joints brown in their terminal half, thus giving the antennæ an annulated appearance; compound eye black.

Prothorax yellow, with a lyre-shaped impression in the middle, and also two obscure transverse grooves above; broadly dark brown on both sides, which are covered with very long hairs of that color. Meso- and metathorax fuscous yellow, covered with hairs.

Abdomen fuscous, pale on ventral side and at apex; in the male, the apex with two very long and slender, inferiorly directed appendages which are covered with very long hairs.

Legs pale, covered with long hairs; anterior tibia and femora spotted with fuscous.

Forewing hyaline, with pale neuration; all veins except subcosta minutely spotted with fuscous; margin of the wing, but especially the basal parts of inner marginal and apical areas, faintly marked with brown; cross-veins fuscous black and margined with fuscous; along inner margin of the wing, several distinct blackish spots caused by the branching and black-marked ends of anal and cubital veins; pterostigma blood-red.

Costal area with about 20 cross-veins; all the cross-veins, excepting those at base of the area, with two or three branches; three cross-veins between radius and radial sector; the sector with 8 or 9 branches.

Hindwing also hyaline; principal veins pale yellow; cross-veins, especially those of the gradate series, fuscous black; pterostigma reddish yellow; hind margin with long hairs in basal parts only; with 6 veins in the gradate series.

Measurements :

Length of body..... 10 mm.
„ „ antennæ ..... 8 „

Length of forewing ..... 13 mm.
„ „ hindwing ..... 11.5 „

A single female(?) specimen captured on Mt. Iwawaki, Prov. Kii, Aug. 17th, 1911, by Mr. Isshiki, is in the collection of Mr. H. Okamoto. Further, a male specimen, captured by Mr. A. Nohira at Minomo near Osaka, is in my collection.

Remark: This species closely resembles *Berotha* (*Isoscelipteron*) *puncticollis*, which was described by Navás[1] from Formosa, but can at once be distinguished from this by the markings on body, especially those on head, prothorax and wing, by wing-venation, etc.

Tribe **Osmylini** Banks, s. emend.

Osmylini Banks, Trans. Amer. Ent. Soc., xxxix, p. 211 (1913).

Nymphini Banks, l.c.

Banks has separated Osmylini and Nymphini as distinct tribes, but I regard this distinction to be too arbitrary for acceptance, inasmuch as there exist between them, so far as I can see, no sufficient difference by which it could be held up. The presence or absence of ocelli, utilized by many other authors for their separation, proves to be of no avail, since there exist under Nymphini forms with ocelli as well as those that are without them. It is therefore obvious that the system of these insects as it now stands, is in much confusion, and hence Osmylini is here put foreward provisionally in the sense which covers Nymphini also. Then the tribe may be defined as follows:

Ocelli present or absent; in the latter case there exist tubercles instead. Wings with numerous cross-veins besides those of gradate series; all cross-veins beset with hairs; in forewing media and cubitus have each one branch runing parallel to them for a considerable distance in forewing; in hindwing cubital branch not always parallel to cubitus; no recurrent vein at base of forewing.

1) Névroptères nouveaux de l'extrème Orient. Rev. Russ. d'Entom., xi, p. 112, fig. 2 (1911).

In his recent work on the Osmylidæ (l.c.), Krüger has created numerous new genera, many of which are without doubt to be ranged under the Tribe Osmylini as defined above. Whatever be the true status of these genera, they may be considered to be of no concern to the Japanese species known at present of the tribe. The latter I refer to the two old genera, *Osmylus* and *Spilosmylus*, which may be distinguished from each other in the following way:

Cubitus of hindwing with a branch running for most part along with and parallel to it ..... *Osmylus*.

Cubitus of hindwing with a branch, which, instead of running along with it, makes its course obliquely towards inner margin of the wing ..... *Spilosmylus*.

Here a few words about the genital appendage of *Osmylus*. Needham (l.c.) has described from the alleged male of *Parosmylus prominens*, a form later referred to *Osmylus*, a curious appendage depending from the hindmost abdominal segment and tentatively called by him the "sperm conveyor." He said: "This is boat-shaped in outline, with a pair of minute palps on the bilobed posterior end. It appears to be capable of being swung in and out on a more or less flexible and muscular pedicel, and when swung inwards, its point must be close to the sperm orifice."

This interesting organ is present in several specimens examined by me, but contrary to Needham's statements, I have found all those individuals to be females, not males. A living specimen of *Osmylus hyalinatus* with the organ laid eggs in the paper bag in which it was held in captivity. This shows that both Petersen and Banks are right in considering specimens without the organ to be the males.

The male genital apparatus of *Osmylus* is characterized by the presence of a pair of peculiar free sacs. In the male of *Spilosmylus* these are wanting, though the female is in possession of the boat-shaped organ before referred to.

Genus *Spilosmylus* Kolbe.

Spilosmylus Kolbe, Netzflüg. Deutch-Ostafricas, p. 33 (1897); Banks, Trans. Amer. Ent. Soc., xxxix, p. 212 and 214 (1913); Krüger, Stett. Ent. Zeit., 74 Jg., p. 52 (1913).

Lysmus Navás, Rev. Russ. d'Ent., xi, p. 112-13 (1911).

Thyridosmylus Krüger, l.c., p. 87.

Ripidosmylus Krüger, l.c., p. 61.

Petersen (l.c.) said that Navás' *Lysmus* might be included in the old genus *Osmylus*, on the ground of the inadequateness of the main character upon which the former was founded; but I think that there exist certain other important characters, which were not noted by Navás in his generic diagnosis but which seem to sufficiently warrant the generic separation of the two. On the other hand, I agree with Banks in considering *Lysmus* to be only a synonym of *Spilosmylus*. Further, I may say that many of Krüger's genera placed under his subfamily Spilosmylinæ are very closely allied to *Spilosmylus* and can scarcely be distinguished from this. It seems to me that at least two of his genera, *Thyridosmylus* and *Ripidosmylus*, should be merged into the present genus, which, in my opinion, may be defined as follows:

Ocelli present. Basal joint of tarsi much longer than the next following joint. In forewing, basal part of costal area narrow; costal cross-veins mostly simple; media forked towards base. In hindwing, a row of cells present beyond end of cubitus; the cubitus has a branch bent posteriorly and not runing parallel to it.

Synopsis of the species found in Japan:

1. A tubercle on hind margin of forewing ..... *tuberculatus*.
—— No tubercle on wing ..... 2.
2. Antennæ fuscous black ..... *nigricornis*.
—— Antennæ yellowish ..... 3.
3. With three black spots placed in a triangle on prothorax .... *flavicornis*.

—— Without such spots on prothorax ....4.
4. Without notable marking on wing.....*immaculatus*.
—— With many distinct markings on wing.....5.
5. Three blackish spots along cubital vein in forewing.....
.....*Hermandinus*.
—— With numerous small brownish spots at base, and at beyond middle of forewing .....*nikkoënsis*.

Spilosmylus tuberculatus (Walker).

Osmylus tuberculatus Walker, Cat. Neuropt. Brit. Mus., ii, p. 255 (1853); Petersen, Ent. Mitt., ii, p. 227–28 (1913).

Osmylus modestus Gerstæcker, Mitt. nat. Ver. Neuvorp. u. Rügen, xxv, d. 77–8 (1893).

Head pale yellow; ocelli yellow; clypeus and palpi yellowish, the latter somewhat darker than the former; antennæ of usual structure with short hairs, a few basal joints somewhat fuscous, all the other joints yellow, though often a few terminal joints are fuscous.

Prothorax yellow, above with four blackish spots, of which the anterior two are rather elongate; further a very small spot at an anterior position; but the markings vary much according to individuals. Very long pale hairs present on each side of prothorax. Meso- and metathorax with brown spots on both sides of the median yellowish part.

Abdomen brownish above, much lighter on ventral side and at apex.

Legs pale or nearly colorless, somewhat darker on tarsal joints; 1st tarsal joint not so much longer than the 2nd as in other *Spilosmylus* species; claws rather small, strongly curved, with a few teeth.

Forewing not broad, subacute at apex, vitreous, with one or two small fuscous spots beyond the middle; also a small tubercle of shiny black marked with three or four yellow lines present at middle of

hind margin, the tubercle measuring only about 1 mm. in diameter and about $\frac{1}{6}$ mm. in height; veins mostly pale but interrupted by blackish; subcosta and radius with strongly pronounced black and pale alternate spaces; pterostigma light brown, with thickened dark brown veins on each side.

All the costal cross-veins simple in my specimens; radial sector with 9–12 branches; cross-veins on the disk very few in number, mostly marked with fuscous.

Hindwing with brown pterostigma; neuration nearly entirely pale whitish, especially in inner marginal area; discal cross-veins mostly fuscous, very small parts of principal veins likewise fuscous.

Measurements:

Length of body	9—11 mm.
„ „ forewing	17—19 „
Width of forewing	6—6.5 „
Length of hindwing	16—17 „

Hab.: A large number of specimens of this species were received by me from the following localities:

Mt. Kinkwa near Gifu, Mr. S. Yamamura coll.
Prov. Harima, Mr. S. Iguchi coll.
Tsuchiura, Prov. Hitachi, Mr. S. Kimura coll.
Kyōto and Yoshino (Prov. Yamato), Mr. A. Nohira coll.
Alikang, Formosa, Mr. H. Sauter coll.[1]

There is also a female specimen captured at Shimpukuji, Prov. Mino, in the collection of the Nawa Entomological Laboratory, Gifu.

Remark: Short and imperfect as is the original description given by Walker, the specimens on hand agree with it so well that I cannot help identifying them with the species. If this identification be correct, I think Gerstæcker's *Osmylus modestus* from Java should also be

1) This specimen I owe to the kindness of Mr. Petersen of Denmark.

identified with *tuberculatus*, since Japanese and Formosan specimens just mentioned agree well with his description of *modestus*.

The tubercle on wing, which has often been considered to be peculiar to the male, is in fact present in both sexes, and shows no difference in the different sex.

Spilosmylus nikkoënsis (Navás).

Lysmus nikkoënsis Navás, Rev. Russ. d'Entom., vi, p. 113, fig. 3 (1911).

Head fuscous black, with two large yellow spots in hind marginal area; ocelli yellow, margined with the same color; clypeus entirely yellow; antennæ yellow with long hairs, a few basal joints darkish, the 3rd joint longer than the 2nd.

Prothorax yellowish with a longitudinal fuscous line, which is occasionally nearly interrupted in the middle, and with two spots on both sides of the line, but these markings vary to a certain extent in different specimens; both sides of prothorax beset with long, pale testaceous hairs.

Meso- and metathorax also yellowish; praescutum of the former with a median blackish line and two black spots on anterior margin; scutum also with two spots on both sides anteriorly; irregular median line present on scutellum.

Abdomen brown above, with a few pale hairs; ventral side yellowish; boat-shaped genital appendage of females dark yellow.

Legs pale yellow, with end of hind-femora fuscous; claws commonly with teeth, but often without them, testaceous, strongly curved.

Forewing not very broad, subacute at apex, inner marginal and apical areas slightly clouded with grey; pterostigma yellowish with brown veinlets on both sides; neuration mostly fuscous; subcosta and radius yellowish, interrupted several times with fuscous spaces; most cross-veins margined with dark brown, forming some small spots at base and at middle as well as beyond middle of the wing.

All the costal veinlets simple; radial sector with 10–12 branches; two series of gradate veinlets irregular and scarcely parallel.

Hindwing with inner marginal area only occasionally slightly clouded with brown; pterostigma slightly fuscous yellow.

Measurements:

Length of body	9—10 mm.
„ „ forewing	16—19 „
Width of „	6.5— 7 „
Length of hindwing	14—15 „

Hab.: Specimens from the following localities are in my collection:

Prov. Harima, Mr. S. Iguchi coll.
Prov. Wakasa, Mr. I. Isaki coll.
Mt. Kinbō near Kumamoto, Mr. K. Yokoyama coll.
Yanagawa, Prov. Chikugo, Mr. T. Takamuku coll.
Hokkaidō(?), Mr. H. Okamoto coll.
Mt. Natsusawatōge, Prov. Shinano; Kyoto; Yoshino, Prov. Yamato; Mr. A. Nohira coll.

Remark: Petersen (l.c.) said that Navás *Lysmus nikkoënsis* is probably referable to *tuberculatus*, but I am decidedly of the opinion that the two are distinct. It may be doubted if the female specimen, which he considered to be *tuberculatus*, really represented that species.

Spilosmylus flavicornis (MacLachlan).

Osmylus flavicornis MacLachlan, Trans. Ent. Soc. Lond., ii, p. 179-80 (1875).

Osmylus faurinus Navás, Ann. de la Soc. Scient. Brux., p. 192 (1910).

Lysmus faurinus Navás, Rev. Russ. d'Entom., xi, p. 114 (1911).

Osmylus? ? flavicornis Krüger, Stett. Ent. Zeit., p. 271 (1913).

Head yellow, ocelli yellow, broadly margined with same color;

clypeus and labium variegated with fuscous; palpi darkish; antennæ yellow with long hairs, a few terminal joints blackish.

Prothorax yellow with three blackish spots placed in a triangle above, and with blackish or pale hairs on both sides. Mesothorax yellowish, spotted with fuscous; metathorax fuscous yellow.

Legs pale yellow, darker near end of tarsi; claws simple, strongly curved.

Abdomen blackish, spotted with yellow, especially on ventral side and at apex; boat-shaped female organ ochraceous yellow, more or less suffused with piceous.

Forewing not broad, subacute at apex, vitreous, with about ten minute piceous spots on cross-veins, two pretty large ones in basal area, a large spot formed of several smaller dots in middle, an irregular line on outer gradate veins, and some spots close together near apex; inner marginal and apical areas clouded with light brown; two fuscous spots on both sides of pterostigma. Principal veins mostly pale yellow; cross-veins piceous.

Costal cross-veins mostly simple; radial secter with 11–13 branches; two series of gradate veins rather irregular and scarcely parallel.

Hindwing usually without marking excepting the brownish pterostigma; gradate veins sometimes margined with fuscous.

Measurements:

Length of body	7.5—11 mm.
„ „ forewing	15—18 „
Width of „	5— 6 „
Length of hindwing	14—17 „

Hab.: Sapporo, Mr. H. Okamoto coll.
Mt. Ibuki, Prov. Mino, Mr. Y. Nawa coll.[1]
Matsuyama, Prov. Iyo, Messrs. Nagai and Takahashi coll.
Yanagawa, Prov. Chikugo, Mr. Takamuku coll.

1) The single male specimen in the collection of the Nawa Entomological Laboratory.

Yoshino, Prov. Yamato, Mr. A. Nohira coll.

Tokyo, Mr. A. Nohira coll.

Remarks: *Osmylus faurinus* Navás seems to me to be a variational form of this species, since the latter is very variable even in the markings of prothorax which usually form a well fixed specific character. Wing markings are especially variable; my Sapporo specimen has the markings considerablly restricted, while in the Matsuyama specimen, they are strongly pronounced even on hindwing.

Spilosmylus immaculatus n. sp.

Head yellow, with a black triangular spot on top, swollen and blackish behind, blackish also around eye; face, clypeus and palpi yellowish. Antennæ long, dark yellow, with concolorous hairs; all the joints, excepting the basal one, are nearly equal in length.

Prothorax yellow with an M-shaped blackish mark and a broad median blackish line above. Meso- and metathorax brownish all over.

Legs pale yellow, suffused with darkish at end of tarsi; claws with teeth, strongly curved.

Abdomen fuscous with a few hairs, spotted with orange yellow, especially on ventral side and at apex; boat-shaped female organ yellowish, unusually small.

Forewing broad, subacute at apex, vitreous; neuration mostly pale, but partly slightly greyish; without spot except on pterostigma which is very slightly darkish on both sides.

Nearly all costal cross-veins simple, but the two or three near base of wing are furcate; radial sector with about ten branches.

Hindwing almost without marking; pterostigma mostly faintly marked with grey.

Measurements:

Length of body ..... 12 mm.

„ „ forewing ..... 19 „

Width of forewing ..... 7 mm.
Length of hindwing..... 17 „

A single female specimen was captured by the author on Mt. Ozetōge, Prov. Kōzuke, July 31, 1913.

Remark: Though resembling *S. Harmandinus* (Navás) and *S. nigricornis* n. sp., this species is peculiar in having no spot on wings excepting greyish pterostigma. Besides, this species differs from the two mentioned in coloration and in structure of body, antennæ, female genital appendage, etc.

Spilosmylus Harmandinus (Navás).

Osmylus flavicoruis Matsumura, Thous. Ins. Jap., i, p. 178, pl. xiii, fig. 7, ♀ (1904), nec MacLachlan.

Osmylus Harmandinus Navás, Ann. de la Soc. Scient. Brux., p. 190–91 (1910).

Lysmus Harmandinus Navás, Rev. Russ. d'Entom., xi, p. 113 (1911).

Head yellowish with an elongate black spot on vertex; greater part of face, including labium, blackish; palpi darkish; ocelli yellow; antennæ yellow, with numerous long concolorous hairs.

Prothorax yellow with three longitudinal fuscous lines, of which the median is much longer and broader than the other two; with numerous black or pale hairs on both sides.

Meso- and metathorax yellowish, with several fuscous spots of various sizes.

Legs yellow, with pale hairs; hindleg much darker than other legs; claws scarcely serrate.

Abdomen fuscous black with pale hairs, spotted with yellowish especially on lateral side and at apex.

Forewing broad, vitreous; neuration mostly blackish, but partly pale; subcosta and radius with a few strongly marked blackish and pale alternate spaces; three blackish spots along cubital vein, the

outermost spot being the smallest and the median the largest; pterostigma yellowish with some thickened black veins on both sides.

Costal cross-veins mostly simple, only occasionally a few of them are furcate; sector with nine or ten branches; two series of gradate veins rather irregular and scarcely parallel.

Hindwing without prominent marking, excepting yellowish pterostigma which is marked with fuscous on both sides.

Measurements:

Length of body	10 mm.
„ „ forewing	18 „
Width of „	6.5 „
Length of hindwing	15 „

A single male specimen, captured by Mr. H. Okamoto at Sapporo, is in my collection.

Remark: *Osmylus flavicoruis* described and figured by Prof. S. Matsumura in his work entitled "Senchū-zukai" seems to be identical with Navás' *O. Harmandinus*, and so I place doubt on the status of the species recently recorded by the same author[1] from Saghalien under the name of *flavicornis*.

Spilosmylus nigricornis n. sp.

Head blackish, swollen above, with long strong hairs; hind margin of head and mouth-parts fuscous black; narrowly brown around eye; antennæ black or piceous, somewhat brownish towards tip.

Prothorax dark yellow, with a narrow median longitudinal line which widens towards both its anterior and posterior ends; two black spots on each side of the line. Meso- and metathorax blackish; lobes more or less swollen, shiny black.

Legs fuscous yellow; claws rather short, not so strongly curved, testaceous, with a few teeth.

1) Erster Beitrag zur Insekten-Fauna von Sachalien, Journ. Coll. Agr., Tohoku Imp. Univ., iv, p, 15 (1911).

Abdomen blackish, with pale hairs; boat-shaped female organ black, with a yellow transverse band.

Forewing broad, vitreous, with black neuration, subacute at apex; subcosta and radius yellowish with several short black spaces; pterostigma yellowish, marked with two large black spots; a black spot exists in a middle cubital cell; several small spot present near base of the wing.

Costal cross-veins mostly simple, though usually a few of them are furcate; sector with 8–11 branches; series of gradate veins somewhat irregular.

Hindwing without marking except on pterostigma which is similarly marked as that of forewing.

Measurements:

Length of body	9—12 mm.
„ „ forewing	15—19 „
Width of „	5.5— 7 „
Length of hindwing	13.5—17 „

Nine female specimens and a single male specimen captured by the author on the shore of Lake Oze, Prov. Kōzuke, on Aug. 1, 1913.

Genus **Osmylus** Latreille.

Osmylus Latreille; Walker, Cat. Neuropt. Brit. Mus., ii, p. 231 (1852); Banks, Trans. Amer. Ent. Soc., xxxix, p. 212 and 215 (1913); Krüger, Stett. Ent. Zeit., p. 38 (1913).

Osmylina Schneider, Monog. Chrysop., p. 36 (1851).

Hyposmylus MacLachlan, Ent. Month. Mag., vi, p. 200 (1870); Krüger, l.c., p. 48.

Parosmylus Needham, Rec. Ind. Mus., iii, p. 309 (1909).

Dictyosmylus Navás, Ann. de la Soc. Scient. Brux., p. 189 (1910); Krüger, l.c., p. 49.

Plethosmylus Krüger, l.c., p. 43.

I agree with Banks in regarding *Hyposmylus*, *Parosmylus* and

Dictyosmylus to be synonyms of *Osmylus*. Moreover, I think that Krüger's *Plethosmylus* is also to be made a synonym of it. *O. hyalinatus* M'L., for which he made that new genus, is a species which stands very near to the type of *Osmylus*, *O. maculatus* F., as was pointed out by MacLachlan.

Consequently, the genus should in my opinion be defined as follows:

Three ocelli present, placed close together. Legs with entire empodia; a spur exists on coxa I in female of most species. Wings broad; media of forewing forked near base; costal cross-veins mostly furcate, sometimes two adjoining veins cross each other or are connected by a short cross-vein; cubitus of both wings has a branch running parallel to it for a considerable distance.

The structure of coxa I, which had never before been used for the systematic purpose by any entomologist except Needham (l.c.), who utilized it for generic distinction, seems to afford a useful differential character for the distinction of species. All the Japanese species of the genus may be distinguished thus:

1. Coxa I without spur, but with a somewhat dilated portion instead ..... *tessellatus*.
—— Coxa I with spur[1] ..... 2.
2. The spur crooked ..... *Pryeri*.
—— The spur not crooked ..... 3.
3. The spur rather long, not directed upward, nor dilated at apex ..... *hyalinatus*.
—— The spur short, directed distinctly upward and dilated at apex ..... *decoratus*.

Osmylus tessellatus MacLachlan. Fig. 2.

Osmylus tessellatus M'Lachlan, Trans. Ent. Soc. Lond., ii, p. 180 (1875).

1) So far as known, the spur is peculiar to the female.

Osmylus? tessellatus Krüger, Stett. Ent. Zeit., p. 270 (1913).

Head black, swollen above; face yellowish with a large furcate black mark between antennæ; antennæ black with a yellow ring around base; ocelli minute, yellow, the foremost one a little apart from the remaining two; palpi fuscous black.

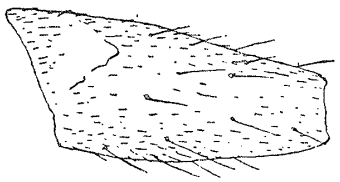


Fig. 2.
Coxa I of *Osmylus tessellatus* M'L. 20 ×.

Prothorax bright piceous, with grey pubescence, posteriorly slightly suffused with yellow; a distinct small yellow spot exists anteriorly in the middle.

Meso- and metathorax piceous, faintly marked with fuscous.

Legs pale yellow, with hairs of same color; hindleg somewhat brownish, especially on femora; end of tarsi darkish; coxa I without spur, but with a somewhat dilated portion instead; claws rather long, with teeth.

Abdomen fuscous black, darker at base, slightly suffused with yellow on lateral sides; last two segments variegated with ochraceous yellow, much hairy; boat-shaped female organ fuscous, yellowish along margin.

Forewing broad, subacute at apex; neuration blackish, partly pale; subcosta and radius yellowish with black spaces, the former commonly darker than the latter; most discal cross-veins broadly margined with dark grey, giving the wing a chequered appearance; some darkish spots on disk and also near apex; pterostigma yellowish with two darkish spots; inner marginal area irregularly marked with greyish; several dark spots along radius; costal cross-veins mostly blackish, but partly pale so as to cause irregular pale and blackish alternate spaces.

Costal cross-veins mostly furcate, some of them in basal area of wing being simple; radial sector with 10–16 branches; discal cells mostly quadrate, irregular in arrangement.

Hindwing hyaline, rarely very slightly tinged with greyish; with-

out marking except a few spots on pterostigma and very faintly clouded spaces along inner margin.

Measurements:

Length of body	14—15 mm.
„ „ forewing	24—26 „
Width of „	9—10 „
Length of hindwing	22—24 „

A male specimen captured by Mr. A. Nohira on Mt. Atago, Kyoto, May 1st '12, and two female specimens captured by Mr. T. Takamuku at Yanagawa, Kiushiu, are in my collection.

Remark: In structure this species resembles certain *Spilosmylus* species more closely than the other three species of the genus.

Osmylus Pryeri MacLachlan. Fig. 3.

Osmylus Pryeri M'Lachlan, Trans. Ent. Soc. Lond., ii, p. 180-81 (1875).

Osmylus? Pryeri Krüger, Stett. Ent. Zeit., p. 270 (1913).

Head yellowish, swollen above; transverse area between bases of antennæ broadly blackish; vertex darkish, especially along margin; clypeus yellow; mouth-parts including palpi darkish; antennæ black.

Prothorax yellowish with blackish hairs; side and hind margin blackish. Meso- and metathorax blackish; lobes much swollen.

Legs pale, sometimes fuscous; coxa I with a crooked spur; claws serrate internally.

Abdomen black with pale hairs, the last segment being especially hairy; boat-shaped female organ of usual structure.

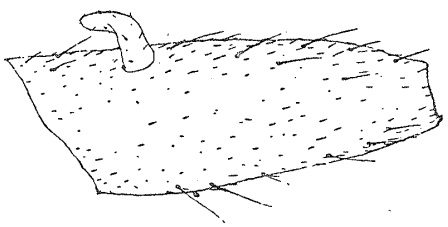


Fig. 3.
Coxa I of *Osmylus Pryeri* M'L. 20 ×.

Forewing acute at apex; neuration mostly blackish, subcosta yellowish, radius also yellowish but partly blackish, a few cross-veins narrowly margined with grey or fuscous; inner

marginal and apical areas clouded with fuscous or grey; a few fuscous spots along posterior side of radius.

Costal cross-veins mostly furcate, excepting those at base of wing; radial sector with ten branches; two series of gradate veins complete and nearly parallel.

Hindwing colorless and hyaline, excepting brown pterostigma.

Measurements:

Length of body	14 mm.
„ „ forewing	25 „
Width of „	9 „
Length of hindwing	23 „

Hab.: A single specimen captured at Nikko(?) is in the collection of the Imperial Agricultural Experiment Station, Tokyo.

Also a single specimen captured at Hikage, Prov. Mino, is in the collection of the Nawa Entomological Laboratory, Gifu.

Further, two specimens from Kamikōchi, Prov. Shinano, captured by Mr. S. Kawai, and from Tokura, Prov. Kōzuke, captured by me, are in my own collection.

Remark: The Nikko(?), Hikage, and Tokura specimens agree very well with the original description in wing-markings, while the Kamikōchi specimen deviates from it in the much restricted markings of wings. In the specimen just referred to, the inner marginal area is not uniformly greyish fuscous, but is irregularly clouded with that color; the ill-defined irregular line running to the wing apex is broken up into pieces, though it is not difficult to trace.

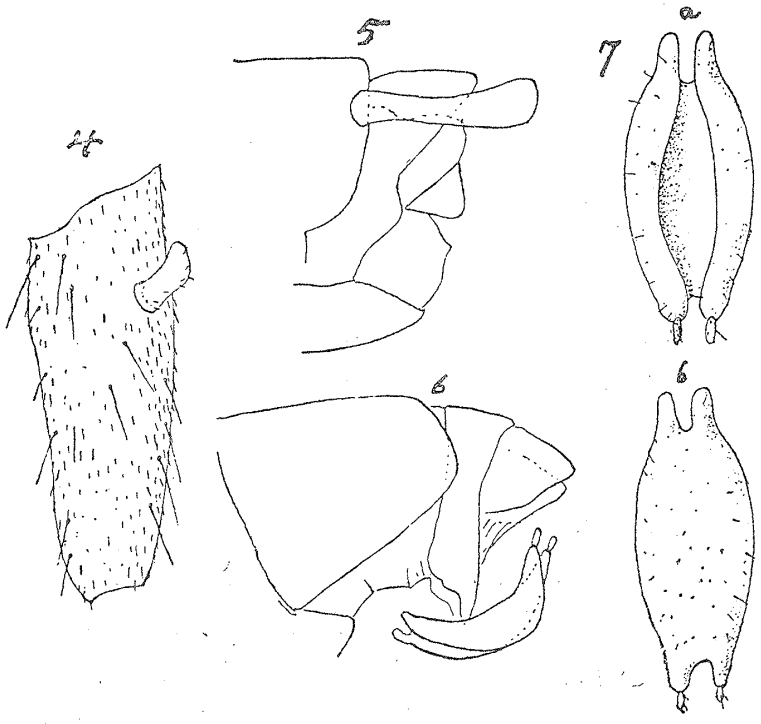
Osmylus decoratus n. sp. Figs. 4—7.

Head yellow with a fuscous x-shaped mark between antennæ; vertex exceedingly swollen; ocelli dark brown; two very minute tubercles behind ocelli; frons and clypeus yellowish; palpi with most joints nearly equal in length; antennæ deep black with few hairs.

Prothorax blackish, with a broad longitudinal median band of

yellow above; numerous long hairs on both sides. Meso- and metathorax blackish; scutellum and postscutellum somewhat yellowish.

Legs pale yellow with concolorous hairs, terminal tarsal joint marked with blackish brown; claws usually strongly serrate internally; coxa I with a short spur, which is directed distinctly upwards and is dilated at apex.



Figs. 4—7.

Osmylus decoratus n. sp.

4, Coxa I, 20 ×. 5, Male genitalia, 10 ×. 6, Female genitalia, 10 ×.
7, Boat-shaped apparatus of female, 15 ×;
a, seen from below; *b*, seen from above.

Abdomen black, with pale yellow hairs; apex yellowish; ventral side spotted with yellow. The last segment in the female very short, split below; boat-shaped organ suspended from the 9th segment by a single sclerite and a somewhat flexible membrane; bilobed at both anterior and posterior ends; the posterior end with two palps on tip of the lobes; marginal area turned downward so as to give the organ

a boat-like shape. In the male, there exist two slender lobes (which are variable in size and shape, and appear to be slender free sacs of an unknown character) at the base of suranal plate; besides, there are two pairs of appendages arising from the last abdominal segment.

Forewing elongate and broad; neuration mostly black but partly pale; subcosta and radius pale yellow; inner marginal area irregularly clouded with grey, causing pale and dark spaces; some darkish spots on pterostigma and near apex; a single darkish spot on disk.

Nearly all costal cross-veins furcate, and several of those at base are united by a short cross-vein; radial sector with 12–16 branches; discal cross-veins numerous and irregular in arrangement; discal cells hexagonal or quadrate, becoming very much elongate towards outer margin.

Hindwing hyaline with dark markings on pterostigma; inner marginal area slightly clouded with pale grey.

Measurements:

Length of body ..... 13—15 mm.
„ „ forewing ..... 26—37 „
Width of „ ..... 10—10.5 „
Length of hindwing ..... 23—24 „

Hab.: Kusakimura, Prov. Harima; two pairs (♂♀), Mr. Iguchi coll.
Prov. Wakasa, a single female specimen, Mr. Isaki coll.
Prov. Chikugo, Kiushiu, a single male specimen, Mr. Takamuku coll.

All the above six specimens are in my collection.

Remark: This species is closely allied to *O. tessellatus* and *O. hyalinatus*, but is distinguishable from both these by markings of head and prothorax, structure of coxa I, etc.

Osmylus hyalinatus MacLachlan. Fig. 8.

Osmylus hyalinatus M'Lachlan, Trans. Ent. Soc. Lond., ii, p. 181 (1875).

Plethosmylus hyalinatus Krüger, Stett. Ent. Zeit., 74 Jg., p. 274 (1913).

Head bright yellow without marking; mouth-parts and clypeus somewhat darker; ocelli minute and placed very close together; antennæ black.

Prothorax blackish, variegated with yellow; above three somewhat yellowish longitudinal lines, of which the median is the broadest. Meso- and metathorax fuscous black with pale hairs.

Legs pale yellow; tarsal joints suffused with fuscous; claws commonly serrate internally, rarely without the serration; coxa I has a rather long spur which is however not so long as in *O. maculatus* of Europe.

Abdomen blackish with pale hairs, yellowish at apex. The boat-shaped organ depending from the last abd. segment in the female yellowish, more or less darker along the margin.

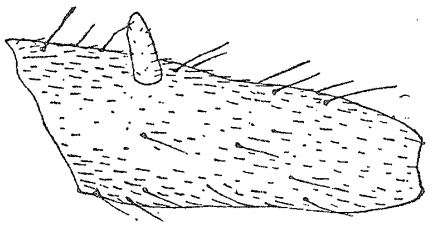


Fig. 8.
Coxa I of *Osmylus hyalinatus* M'L. 20 ×.

Forewing broad, subacute at apex, hyaline with a grey tinge; commonly without spot, sometimes with a small discal spot and some more spots near apex; outer series of gradate veinlets often narrowly margined with faint fuscous; inner marginal area occasionally clouded. Pterostigma with some dark fuscous spots. Neuration mostly blackish or fuscous; subcosta and radius yellowish, though sometimes pale or dark greyish.

Most costal cross-veins are furcate, except several basal ones, which are simple; here and there two adjoining furcate veins cross each other or are united by a short cross-vein; radial sector with 10-14 branches; two series of gradate veinlets complete and nearly parallel.

Hindwing hyaline, with brownish pterostigma.

Measurements:

Length of body	12—15 mm.
„ „ forewing	21—26 „
Width of „	8—10 „
Length of hindwing	18—22 „

Hab.: Of this species, a large number of specimens were received by me from the following localities:

Sapporo, Hokkaido, Mr. H. Okamoto coll.
Kamikōchi, Prov. Shinano, Mr. S. Kawai coll.
Mt. Ibuki, Prov. Ōmi, Mr. S. Yamamura coll.
Prov. Wakasa, Mr. I. Isaki coll.
Prov. Harima, Mr. S. Iguchi coll.
Matsuyama, Prov. Iyo, Messrs. T. Nagai & Takahashi coll.
Kyōto, and Tottori, Prov. Inaba, Mr. A. Nohira coll.

Further, a series of specimens from various localities on the main island of Japan is contained in the collection of the Imperial Agricultural Experiment Station, Tokyo. They were kindly shown me by Dr. T. Miyake.

Remark: So far as the wing-markings go, this species is very near to *O. decoratus*.

The prothorax in the Kamikōchi specimens shows a coloration variegated with deep black, on which account I have at first doubted if those specimens did not represent a species distinct from *O. hyalinatus*.

P. S. While this paper was under press, I have received Mr. Okamoto's paper "Zwei neue Arten der japanischen Osmyliden," Ent. Mitt., Band iii, Nr. 1, Jan. '14. To my regret, I can not accept the two species described by him as new under the names of *Osmylus* (*Lysmus*) *japonicus* and *O.* (*L.*) *nipponensis*. In my view they are identical with *Spilosmylus tuberculatus* (Walker) and *S. nikkoënsis* (Navás) respectively.
